This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for depositing a doped silicon dioxide layer onto a wafer comprising:

introducing a dopant precursor gas having a dopant precursor gas flow rate and a silicon-containing gas having a silicon-containing gas flow rate into a plasma within a deposition chamber, wherein a ratio of the dopant precursor gas flow rate to the silicon-containing gas flow rate has an initial value;

increasing the ratio within the deposition chamber from the initial value to a final value during an initial deposition period; and

maintaining the ratio within the deposition chamber at the final value during a final deposition period,

wherein during the initial deposition period and the final deposition period the dopant precursor gas and the silicon-containing precursor gas react in the plasma to form the doped silicon dioxide layer on the wafer.

2. (Currently Amended) The method of Claim 1, wherein a portion of the doped silicon dioxide layer deposited during the initial deposition period has about the same dopant concentration as a portion of the doped silicon dioxide layer deposited during the final period.

3. (Original) The method of Claim 1, further comprising etching one or more contact holes through the doped silicon dioxide layer, wherein the one or more contact holes have straight sidewalls.

4. (Currently Amended) The method of Claim 1, further comprising determining a duration of the initial deposition period by measuring a temperature of the wafer during a test deposition of a doped silicon dioxide layer, wherein the duration is the time required for the temperature to reach an essentially constant value.

5. (Previously Presented) The method of Claim 1, further comprising:

measuring a concentration of dopant incorporated into a portion of a silicon dioxide layer as a function of the ratio for a first series of test depositions performed at a constant temperature;

repeating the measurement of dopant concentration for a second series of test depositions performed at a different constant temperature; and

measuring a temperature profile of the wafer during a third test deposition wherein the temperature is not held constant,

whereby the initial value of the ratio is determined.

6. (Currently Amended) The method of Claim 1, wherein increasing the ratio from the initial value to the final value comprises:

dividing the initial deposition period into a number of increments; and

increasing the ratio by an intermediate value at each increment.

7. (Original) The method of Claim 1, wherein the dopant precursor gas is phosphine and the silicon-containing precursor gas is silane.

8. (Original) The method of Claim 1 further comprising preheating the wafer to a preheat temperature.

9. (Original) The method of Claim 8, wherein the dopant precursor gas is phosphine and the silicon-containing precursor gas is silane, the preheat temperature is 350°C, the initial value of the ratio is about 0.49, and the final value of the ratio is about 0.77.

10. (Original) The method of Claim 1 wherein the dopant precursor gas is selected from the group consisting of PH_3, SiF_4, and B_2H_6.

11. (Original) A method for depositing a doped silicon dioxide layer comprising:

introducing a dopant precursor gas and a silicon-containing gas into a plasma at a dopant precursor gas flow rate and a silicon-containing gas flow rate for a deposition period; and

during the deposition period, adjusting a ratio of the dopant precursor gas flow rate and the silicon-containing gas flow rate as a function of wafer temperature, whereby the dopant precursor gas and silicon-containing gas react in the plasma to form the doped silicon dioxide layer having a defined dopant concentration.

12. (Original) The method of Claim 11, wherein the dopant concentration is essentially uniform throughout the layer.

13. (Original) The method of Claim 11, further comprising etching one or more contact holes through the doped silicon dioxide layer, wherein said one or more contact holes have essentially straight sidewalls.

14. (Previously Presented) The method of Claim 11, further comprising:

measuring a concentration of dopant incorporated into a portion of a silicon dioxide layer as a function of the ratio for a first series of test depositions performed at a constant temperature;

repeating the measurement of dopant concentration for a second series of test depositions performed at a different constant temperature; and

measuring a temperature profile of the wafer during a third test deposition wherein the temperature is not held constant, whereby a set of values of the ratio to be used during the deposition are determined.

15. (Original) The method of Claim 14, wherein:

the temperature profile comprises an initial period during which the temperature of the wafer is increasing and a final period during which the temperature of the wafer is constant; and

during the deposition the ratio is increased from an initial value to a final value during the initial period and the ratio is held at the final value during the final period.

16. (Original) The method of Claim 15, wherein increasing the ratio from the initial value to the final value comprises:

dividing the initial period into a number of increments; and

increasing the ratio by an intermediate value at each increment.

17. (Original) The method of Claim 11, wherein the dopant precursor gas is phosphine and the silicon-containing precursor gas is silane.

18. (Original) The method of Claim 11 further comprising preheating the wafer to a preheat temperature.

19. (Original) The method of Claim 18, wherein the dopant precursor gas is phosphine and the silicon-containing precursor gas is silane, the preheat temperature is 350°C, the initial value of the ratio is about 0.49, and the final value of the ratio is about 0.77.

20. (Original) The method of Claim 11 wherein the dopant precursor gas is selected from the group consisting of PH_3, SiF_4, and B_2H_6.

21. (Previously Presented) A method for depositing a doped silicon dioxide layer onto a wafer, the method comprising:

introducing a dopant precursor gas having a dopant precursor gas flow rate and a silicon-containing gas having a silicon-containing gas flow rate into a plasma, wherein a ratio of the dopant precursor gas flow rate to the silicon-containing gas flow rate has an initial value;

increasing the ratio from the initial value to a final value during an initial period;

determining a duration of the initial period by measuring a temperature of the wafer during a test deposition of a doped silicon dioxide layer, wherein the duration is the time required for the temperature to reach an essentially constant value; and

maintaining the ratio at the final value during a final period,

wherein during the initial period and the final period the dopant precursor gas and the silicon-containing precursor gas react in the plasma to form the doped silicon dioxide layer on the wafer.

22. (Previously Presented) A method for depositing a doped silicon dioxide layer onto a wafer, the method comprising:

introducing a dopant precursor gas having a dopant precursor gas flow rate and a silicon-containing gas having a silicon-containing gas flow rate into a plasma, wherein a ratio of the dopant precursor gas flow rate to the silicon-containing gas flow rate has an initial value;

increasing the ratio from the initial value to a final value during an initial period;

maintaining the ratio at the final value during a final period, wherein during the initial period and the final period the dopant precursor gas and the silicon-containing precursor gas react in the plasma to form the doped silicon dioxide layer on the wafer; and

measuring a concentration of dopant incorporated into a portion of a silicon dioxide layer as a function of the ratio for a first series of test depositions performed at a constant temperature;

repeating the measurement of dopant concentration for a second series of test depositions performed at a different constant temperature; and

measuring a temperature profile of the wafer during a third test deposition wherein the temperature is not held constant, whereby the initial value of the ratio is determined.

23. (Previously Presented) A method for depositing a doped silicon dioxide layer, the method comprising:

introducing a dopant precursor gas and a silicon-containing gas into a plasma at a dopant precursor gas flow rate and a silicon-containing gas flow rate for a deposition period;

adjusting, during the deposition period, a ratio of the dopant precursor gas flow rate and the silicon-containing gas flow rate as a function of wafer temperature, whereby the dopant precursor gas and the silicon-containing gas react in the plasma to form the doped silicon dioxide layer having a defined dopant concentration;

measuring a concentration of dopant incorporated into a portion of a silicon dioxide layer as a function of the ratio for a first series of test depositions performed at a constant temperature;

repeating the measurement of dopant concentration for a second series of test deposition performed at a different constant temperature; and

measuring a temperature profile of the wafer during a third test deposition wherein the temperature is not held constant,

whereby a set of values of the ratio to be used during the deposition are determined.

24. (Previously Presented) The method of Claim 23, wherein:

the temperature profile comprises an initial period during which the temperature of the wafer is increasing and a final period during which the temperature of the wafer is constant; and

during the deposition the ratio is increased from an initial value to a final value during the initial period and the ratio is held at the final value during the final period.

25. (Previously Presented) The method of Claim 24, wherein increasing the ratio from the initial value to the final value comprises:

dividing the initial period into a number of increments; and

increasing the ratio by an intermediate value at each increment.